

I claim:

1. A method for selecting an intended word entered using a reduced keypad, where each of one or more keys of the reduced keypad is mapped to a plurality of letters, the method comprising:

5 for an entered key input using a single-tap approach in which one of the keys is pressed only once for each letter, determining one or more sequences of letters as the intended word based on a score for each of the one or more sequences of letters; and,
10 presenting the one or more sequences of letters as the intended word, where a user selects the intended word from the one or more sequences of letters without resorting to a multiple-tap approach in which one of the keys is pressed at least once for each letter, and where the user can indicate without resorting to the multiple-tap approach an accepted one or more initial letters of the intended word from the one or more sequences of letters to cause redetermination of the one or more sequences of letters presented as the intended word.

15 2. The method of claim 1, wherein the reduced keypad is a numeric keypad.

3. The method of claim 1, wherein the sequences of letters each corresponds to a word not listed in a predetermined dictionary.

4. The method of claim 1, wherein the sequences of letters each corresponds to a pseudo-word.

5. The method of claim 1, further comprising receiving selection of the intended word from the user from the one or more sequences of letters.

6. The method of claim 1, further comprising:

receiving indication of a first letter of the intended word from the user; and,

5 repeating the method such that the one or more sequences of letters are redetermined taking into account the first letter of the intended word indicated by the user.

7. The method of claim 6, further comprising:

receiving indication of a second letter of the intended word from the user; and,

repeating the method such that the one or more sequences of letters are redetermined

10 taking into account the first and the second letters of the intended word indicated by the user.

8. The method of claim 1, wherein the user has accepted a number of letters of the intended word, the number equal to zero or more, and determining the one or more sequences of letters comprises determining the one or more sequences of letters

15 consistent with the entered key input and the number of letters accepted by the user.

9. The method of claim 8, wherein the one or more sequences of letters comprises a sequence of letters for each letter corresponding to a number within the entered key input immediately after a part of the entered key input corresponding to the number of letters accepted by the user.

10. The method of claim 9, wherein the sequences of letter for each letter corresponding to the number within the entered key input immediately after the part of the entered key input corresponding to the number of letters accepted by the user comprises a most likely sequence of letters for each letter corresponding to the number within the entered key
5 input immediately after the part of the entered key input corresponding to the number of letters accepted by the user.

11. The method of claim 10, wherein the most likely sequence of letters for each letter corresponding to the number within the entered key input immediately after the part of the entered key input corresponding to the number of letters accepted by the user is
10 determined by using a letter language model.

12. The method of claim 11, wherein using the letter language model comprises using an n-gram letter model.

13. The method of claim 1, wherein determining the one or more sequences of letters comprises using a letter language model.

15 14. The method of claim 13, wherein using the letter language model comprises using an n-gram letter model.

15. The method of claim 1, further comprising receiving the entered key input.

16. The method of claim 1, further comprising:

determining a word corresponding to the entered key input as the intended word;

determining whether the word determined is in a dictionary of words; and,

ending the method in response to determining that the word determined is in the

5 dictionary of words.

17. The method of claim 1, wherein the method is performed by execution of a computer program by a processor from a computer-readable medium.

18. A computer-readable medium having instructions stored thereon for execution by a

processor to perform a method for selecting an intended word entered using a reduced

10 keypad, where each of one or more keys of the reduced keypad is mapped to a plurality of letters, the method comprising:

repeating,

for an entered key input, a user having accepted a number of letters of the

intended word, the number equal to zero or more, determining one or more sequences of

15 letters as the intended word consistent with the entered key input and the number of letters accepted by the user;

presenting the one or more sequences of letters as the intended word to the user;

and,

receiving indication that an additional one of the letters of the intended word has

20 been accepted by the user, such that the number of letters of the intended word accepted is increased by one,

until indication has been received that the user has selected one of the one or more sequences of letters presented as the intended word.

19. The medium of claim 18, wherein the reduced keypad is a numeric keypad.

20. The medium of claim 18, where the sequences of letters each corresponds to one of a
5 word not listed in a predetermined dictionary and a pseudo-word.

21. The medium of claim 18, wherein the one or more sequences of letters comprises at least one sequence of letters for each letter corresponding to a number within the entered key input immediately after a part of the entered key input corresponding to the number of letters accepted by the user.

10 22. The medium of claim 21, wherein the at least one sequence of letters for each letter corresponding to the number within the entered key input immediately after the part of the entered key input corresponding to the number of letters accepted by the user comprises a most likely sequence of letters for each letter corresponding to the number within the entered key input immediately after the part of the entered key input
15 corresponding to the number of letters accepted by the user.

23. The medium of claim 18, wherein the one or more sequences of letters is determined by using a letter language model.

24. The medium of claim 23, wherein using the letter language model comprises using an n-gram letter model.

25. The medium of claim 18, the method further comprising receiving the entered key input.

5 26. The medium of claim 18, the method further comprising:

determining a word corresponding to the entered key input as the intended word;

determining whether the word determined is in a dictionary of words; and,

ending the method in response to determining that the word determined is in the dictionary of words.

10 27. A method for selecting a word entered using a reduced keypad, where each of one or more keys of the reduced keypad is mapped to a plurality of letters, the method comprising:

receiving key input corresponding to the word, the key input having a left context;

for each word in a vocabulary that is consistent with the key input, determining a

15 probability of the word given the left context, and adding the word and the probability of the word to an array of word-probability pairs;

finding one or more potential words from a dictionary of words, where each potential word has a cost between the entered key input and a sequence corresponding to the potential word less than a maximum cost;

20 determining a probability of each potential word given the left context and taking into account a probability that each letter of the potential word is misspelled, and adding the

potential word and the probability of the word to the array;

determining one or more sequences of letters consistent with the entered key input and a number of letters accepted by a user, the number equal to zero or more, the one or more sequences of letters including at least one sequence of letters for each letter

5 corresponding to a number within the entered key input immediately after a part of the entered key input corresponding to the number of letters accepted by the user;

determining a probability of each sequence of letters taking into account an out-of-vocabulary penalty and a first occurrence bonus, and adding the sequence of letters and the probability of the sequence of letters to the array;

10 sorting the array of word-probability pairs in decreasing order of probability; and,

presenting a first number of words from the array of word-probability pairs to the user, where the user selects the word corresponding to the entered key input from the first number of words presented and where the user can indicate additional letters have been accepted to increase the number of letters accepted by the user and to cause

15 redetermination of the one or more sequences of letters.

28. The method of claim 27, wherein the reduced keypad is a numeric keypad.

29. The method of claim 27, further initially comprising, for each word in a cache that is consistent with the key input, determining a probability of the word given the left context, and adding the word and the probability of the word to an array of word-probability pairs.

20 30. The method of claim 27, further comprising:

for each word in the vocabulary that is consistent with the key input as an initial part

of the word, determining a probability of the word given the left context, and, upon determining that the probability is greater than a greatest probability so far determined, setting the greatest probability to the probability and a greatest probability word associated with the greatest probability to the word;

5 upon determining that the greatest probability is at least a number of times greater than a word of a first word-probability pair of the array of word probability-pairs, adding the greatest probability word associated with the greatest probability and the greatest probability a new first word-probability pair to the array.

31. The method of claim 27, further comprising:

10 finding one or more additional potential words from the dictionary, where each additional potential word has a cost between the entered key input and a prefix of a sequence corresponding to the potential word less than a maximum cost;

 determining a probability of each potential additional word given the left context and taking into account a partial word penalty, and upon determining that the probability is
15 greater than the greatest probability so far determined, setting the greatest probability to the probability of the potential additional word and the greatest probability word associated with the greatest probability to the potential additional word.

32. The method of claim 27, wherein the one or more sequences of letters are determined by using a letter language model.

20 33. The method of claim 31, wherein using the letter language model comprises using an n-gram letter model.

34. The method of claim 27, wherein the method is performed by execution of a computer program by a processor from a computer-readable medium.

35. An apparatus comprising:

5 a plurality of keys of a reduced keypad, each of one or more of the keys mapped to a plurality of letters, the plurality of keys used to enter key input corresponding to a word using a single-tap approach in which one of the keys is pressed only once for each letter, the key input having at least one of a left context and a right context; and,

10 a word-determining logic designed to determine one or more sequences of letters as the word and to present the one or more sequences of letters, where a user selects the word corresponding to the key input from the one or more sequences of letters without resorting to a multiple-tap approach in which one of the keys is pressed at least once for each letter, and where the user can indicate without resorting to the multiple-tap approach an accepted one or more initial letters of the word from the one or more sequences to cause redetermination of the one or more sequences of letters presented.

15 36. The apparatus of claim 35, wherein the reduced keypad is a numeric keypad.

20 37. The apparatus of claim 35, further comprising a spell-checking logic designed to provide potential alternative words for the word corresponding to the key input entered, where the word is misspelled, taking into account that the word was entered using the plurality of keys, as opposed to a keyboard having a unique key for each of a plurality of letters.

38. The apparatus of claim 37, wherein the spell-checking logic is further to determine one or more potential words to the word where the word is not found in a dictionary of words, by at least finding the one or more potential words from the dictionary, each potential word having a cost between the key input and a sequence corresponding to the
5 potential word less than a maximum cost.

39. The apparatus of claim 35, wherein the word-determining logic is further designed to determine the word corresponding to the key input by using a machine learning approach based on one or more of the at least one of the left context and the right context of the key input.

10 40. The apparatus of claim 39, wherein the spell-checking logic is part of the word-determining logic.

41. The apparatus of claim 35, wherein the apparatus is a telephone.

42. The apparatus of claim 41, wherein the apparatus is a mobile telephone.

15 43. The apparatus of claim 41, wherein the apparatus is one of: a cellular telephone, a corded telephone, a cordless telephone, a digital telephone, and a radio telephone.

44. The apparatus of claim 35, wherein the apparatus is one of: a pager, a desktop computer, a laptop computer, a handheld device, a personal-digital assistance (PDA) device, and a remote control device.

45. The apparatus of claim 35, wherein the word-determining logic comprises a computer program stored on a computer-readable medium for execution by a processor.

45. The apparatus of claim 35, wherein the word-determining logic comprises a computer program stored on a computer-readable medium for execution by a processor.